Sustainable Seas Expeditions
draft Cruise Plan for
Olympic Coast National Marine Sanctuary

Olympic Coast National Marine Sanctuary
138 W. 1st St.
Port Angeles, WA 98362-2600
360-457-6622
fax 360-457-8496

February 17, 1999

DRAFT CRUISE PLAN:

Navy Ship: *DISCOVERY BAY* Cruise Number: ?

Cruise Title: Sustainable Seas Expeditions

Study Area: Olympic Coast National Marine Sanctuary (OCNMS)

Sponsoring Institution: NOAA's National Ocean Service (NOS), Sustainable Seas Expedition (SSE), National Geographic Society (NGS), U.S. Navy (USN)

Cruise Description and Objectives: Sustainable Seas Expeditions (SSE) in OCNMS will focus on locating and exploring rare and representative habitats and associated species along the continental shelf and submarine canyons. SSE will also attempt to characterize seafloor habitats and biological communities between sites with varying degrees of bottom trawling history. Fish behavior experiments will be conducted to correlate with previous survey trawl density estimates. Special interest areas, such as cold-seeps, will be surveyed for both geological and biological features. And education and exploration projects will be undertaken to highlight special undersea communities to the lay public.

Synopsis of Scientific Measurements: Scientists will collect video records of macroinvertebrate communities and seafloor habitats, fish behavior, and special geological formations.

Chief Scientist: Dr. Sylvia Earle

ORGANIZATIONAL STRUCTURE – *(Definition of specific roles/ responsibilities are currently being negotiated and will be forwarded to you)*

1.1 STRUCTURE

- *Craft Master* (Commanding Officer of *Discover Bay*) - Final approval authority for all operations, including (in conjunction with the Dive Supervisor) the decision to launch the sub.
- *Chief Scientist* -
- *Mission Coordinator* –
- *Dive Supervisor* - Responsible for the procedures and coordination of all dive operations, makes final decision in conjunction with the Craft Master to launch the sub.
- *Principal Investigator* - Responsible for the individual project content.
- *Pilot* - Certified DeepWorker pilot approved for the specific mission dive.
- *Mission Log Coordinator* – Responsible for compiling the Mission Log for the NGS SSE Web site.

1.2 PROTOCOL

Dive Authority – The Craft Master and the Dive Supervisor will make the final decision on dive operations.

Project implementation –

2.0 OVERVIEW OF OPERATIONS

SSE operations in OCNMS will be a combined effort of the following organizations: SSE, NOAA, OCNMS, USN, WDFW, and the U.S. Geological Survey (USGS). Daytime operations will primarily be devoted to *DeepWorker* projects. Potential nighttime activities may include some *DeepWorker* projects, but will primarily consist of side-scan sonar surveys, collecting plankton and water samples, bottom grabs, and ROV work (plans/equipment for night ops are in development). The cruise will formally commence on June 16 (Wednesday), with the loading aboard *Discovery Bay* in the morning, and leaving Keyport for a Open House at the Seattle Aquarium pier. *Discovery Bay* will train for launch/recovery dives on June 17 and arrive on site off the Washington coast on June 18, for additional pilot evaluation dives in nearshsore waters. Frequent small boat trips by OCNMS boats (*R/V Tatoosh* and/or *OC2*) will transfer day visitors to *Discovery Bay* throughout the cruise, transfer Web materials to shore, and rotate scientific personnel on/off as appropriate. An end-of-cruise Open House will be conducted in Port Angeles the morning of June 30 (Wednesday), followed by disembarkation of all personnel and equipment the afternoon of June 30, which will conclude the SSE mission.

3.0 ITINERARY

A projected day-by-day synopsis of daily activities and the timing of major actions.

JUNE

16 0800 SSE equipment loaded and embarkation aboard ship at Keyport/Bangor dock
1100 Conclude loading and ship leaves Keyport, en route to Seattle
1500 Ship arrives at Seattle Aquarium Pier 55 and sets up Open House
1600 - 2000 Open House

17 0800 Pre-Cruise meeting
1000 Launch/recovery training (Project Dive I), then en route to Cape Alava

18 0500 On site at Cape Alava
0600 Pre-dive checks

0700 Begin Evaluation Dives (Project Dive II)
1800 Conclude Evaluation Dives
1900 Begin side-scan sonar surveys (SSS)

19 0500 Conclude SSS, transit to Project Dive (PD) III-1
0600 Pre-dive checks
0700 Begin PD III-1
0930 Conclude PD III-1; swap batteries; pre-dive checks
1100 Begin PD IV-1
1400 Conclude PD IV-1; swap batteries; pre-dive checks
1530 Begin PD III-2
1800 Conclude PD III-2; swap batteries; conclude sub dives
1900 Begin SSS

20 0500 Conclude SSS, transit to PD IV-2 (SSS crew transferred ashore via OCNMS boat during day)
0600 Pre-dive checks
0700 Begin PD IV-2
0930 Conclude PD IV-2; swap batteries; pre-dive checks
1100 Begin PD III-3
1400 Conclude PD III-3; swap batteries; pre-dive checks
1530 Begin PD III-4
1800 Conclude PD III-4; swap batteries; conclude sub dives
1900 Begin night ops

21 0500 Conclude night ops, transit to PD V-1
0600 Pre-dive checks
0700 Begin PD V-1
0930 Conclude PD V-1; swap batteries; pre-dive checks
1100 Begin PD III-5
1400 Conclude PD III-5; swap batteries; pre-dive checks
1530 Begin PD V-2
1800 Conclude PD V-2; swap batteries; conclude sub dives
1900 Begin night ops

22 0500 Conclude night ops, transit to PD IV-3
0600 Pre-dive checks
0700 Begin PD IV-3
0930 Conclude PD IV-3; swap batteries; pre-dive checks
1100 Begin PD IV-3
1400 Conclude PD IV-3; swap batteries; pre-dive checks
1530 Begin PD VII-1
1800 Conclude PD VII-1; swap batteries; conclude sub dives
1900 Ship steams into port for refueling (if required)

23 Fueling completed (if required), ship returns to dive site (contingency night dive)

24 0500 Conclude night ops, transit to PD VII-2
0600 Pre-dive checks
0700 Begin PD VII-2
0930 Conclude PD VII-2; swap batteries; pre-dive checks
1100 Begin PD III-6
1400 Conclude PD III-6; swap batteries; pre-dive checks
1530 Begin PD IV-4
1800 Conclude PD IV-4; swap batteries; conclude sub dives
1900 Begin night ops

25 0500 Conclude night ops, transit to PD IV-5
0600 Pre-dive checks
0700 Begin PD IV-5
0930 Conclude PD IV-5; swap batteries; pre-dive checks
1100 Begin PD VI-1
1400 Conclude PD VI-1; swap batteries; pre-dive checks
1530 Begin PD VI-2
1800 Conclude PD VI-2; swap batteries; conclude sub dives

1900 Begin night ops

26 0500 Conclude night ops, transit to PD VIII-1
0600 Pre-dive checks
0700 Begin PD VIII-1
0930 Conclude PD VIII-1; swap batteries; pre-dive checks
1100 Begin PD VIII-2
1400 Conclude PD VIII-2; swap batteries; pre-dive checks
1530 Begin PD VIII-3
1800 Conclude PD VIII-3; swap batteries; conclude sub dives
1900 Begin night ops

27 0500 Conclude night ops, transit to PD V-3
0600 Pre-dive checks
0700 Begin PD V-3
0930 Conclude PD V-3; swap batteries; pre-dive checks
1100 Begin PD IX-1
1400 Conclude PD IX-1; swap batteries; pre-dive checks
1530 Begin PD IV-6
1800 Conclude PD IV-6; swap batteries; conclude sub dives
1900 Begin night ops

28 0500 Conclude night ops, transit to PD V-4
0600 Pre-dive checks
0700 Begin PD V-4
0930 Conclude PD V-4; swap batteries; pre-dive checks
1100 Begin PD VI-3
1400 Conclude PD VI-3; swap batteries; pre-dive checks
1530 Begin PD VII-3
1800 Conclude PD VII-3; swap batteries; conclude sub dives
1900 Begin night ops

29 0500 Conclude night ops, transit to PD V-5
0600 Pre-dive checks
0700 Begin PD V-5
0930 Conclude PD V-5; swap batteries; pre-dive checks
1100 Begin PD V-6
1400 Conclude PD V-6; swap batteries; pre-dive checks
1530 Contingency dive
1800 Conclude contingency dive; conclude sub dives
1900 Transit to Port Angeles

30 0800 Ship arrives Port Angels City pier
0900 Set up for Open house
1000-1300 Open House
1330 Transit to USCG pier, Ediz Hook
1400-1500 Disembarkation of SSE equipment and scientific personnel at USCG pier
1600 Ship departs Port Angeles for transit to Keyport; concludes SSE project

4.0 CONTACT PERSONNEL

Scientific Operations:

Ed Bowlby, Mission Coordinator
Olympic Coast National Marine Sanctuary
138 W. 1st St.
Port Angeles, WA 98362-2600
360-452-2153
fax 360-457-8496
ebowlby@ocean.nos.noaa.gov

Dr. Sylvia Earle, Chief Scientist
Explorer-in-Residence, National Geographic Society
1145 17th St. NW
Washington, DC 20036
202-862-8678
fax 202-429-5709

Ship Operations:

Scot Groulik
Naval Undersea Warfare Center
Division Keyport, USN
Ocean Engineering Div., Code 521
610 Dowell St.
Keyport, WA 98345-7610
360-396-2501, x261
fax 360-396-2259
sgroulik@kpt.nuwc.navy.mil

Dana Wilkes
NOAA OPS Officer
Pacific Marine Center
1801 Fairview Ave. East
Seattle, WA 98102
206-553-4468, 4469
fax 553-5449
Dana.Wilkes@noaa.gov

5.0 PROJECT DESCRIPTIONS

Project descriptions can only be considered a guide as to how the Chief Scientist and Principal Investigators expect the projects to progress without being able to predict the weather, operational and scheduling problems, and equipment failures. Appendix A will list geographical positions of transects, sites, and stations. Use the following format and include any contingency dives (NOTE: Contingency dives provide information on potential alternative dives to be conducted if a scheduled project cannot be conducted at the primary or alternative locations).

5.1 PROJECT DIVES

PROJECT DIVE I - Launch/recovery training
OBJECTIVE: Train deck crew and pilots on launch and recovery protocols
TASKS: Practice sessions using ship's crane and crew with sub and pilots for launch/recovery ops
PILOTS: TBD
DIVE LOCATION/DURATION: TBD
ALTERNATIVE SITES:
EQUIPMENT REQUIRED ON SUB: Standard equipment
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops

PROJECT DIVE II - Evaluation training dives
OBJECTIVE: Evaluate pilots to determine if they can dive deeper than 100-150 ft.
TASKS: Dives in 100-150 ft. levels
PILOTS: Ed Bowlby, Mary Sue Brancato, Bob Steelquist, Tom Jagielo, and Annette Hoffmann
DIVE LOCATION/DURATION: Cape Alava area; 1 hr. duration
ALTERNATIVE SITES: TBD
EQUIPMENT REQUIRED ON SUB: Standard equipment
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops

PROJECT DIVE III - Science: *In situ studies of groundfish and invertebrates in trawlable and untrawlable survey habitats*
PRINCIPAL INVESTIGATORS: Tom Jagielo and Annette Hoffmann
OBJECTIVE: Survey rockfish densities and behaviors related to survey trawls population estimates
TASKS: Video transects and behavioral observations. For behavioral experiment, both subs are required, with one being mobile (piloted by expert pilot) and the other stationary and recording observations. Vertical video sampling also to be conducted for characterizing seafloor and macroinvertebrate, epifaunal communities.
PILOTS: Tom Jagielo, Annette Hoffmann (and expert pilot for simultaneous dive test)
DIVE LOCATION/DURATION: Specific dive sites TBD along random blocks within rectangular study area bounded north and south by 4813' and 4816' latitudes and east and west by 12517'W and 12538'W longitudes. Max Depth will not exceed 350 ft. Dive duration will be 2-3 hrs.
ALTERNATIVE SITES: Dive locations for other projects, or if bad weather conduct refresher dives at sites north of Cape Flattery or near Grays Harbor.
EQUIPMENT REQUIRED ON SUB: Digital video camera equipped with laser dots and capable of being panned to vertical and return to precise oblique angle.
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops

PROJECT DIVE IV - Science: *Comparison of habitat complexity and benthic invertebrate communities in lightly and heavily trawled areas*
PRINCIPAL INVESTIGATORS: Ed Bowlby and Mary Sue Brancato
OBJECTIVE: Characterize seafloor habitat and biota in heavily vs. lightly trawled sites
TASKS: Video transects and sediment/infernal sampling (if allowed)
PILOTS: Ed Bowlby and Mary Sue Brancato
DIVE LOCATION/DURATION: Specific dive sites TBD along random blocks within rectangular study area bounded north and south by 4813' and 4816' latitudes and east and west by 12517'W and 12538'W longitudes. Secondary sites will be determined from commercial trawl logs. Max Depth will not exceed 350 ft. Dive duration will be 2-3 hrs.
ALTERNATIVE SITES: Dive locations for other projects, or if bad weather conduct refresher dives at sites north of Cape Flattery or near Grays Harbor.
EQUIPMENT REQUIRED ON SUB: Digital video camera capable of both vertical and oblique angles, and rigged for laser dots. If samples allowed to be collected, appropriate sampling device and storage tray consistent with other sites.
EQUIPMENT REQUIRED ON SHIP: If samples collected, preservatives and places to store

PROJECT DIVE V - Exploration: *Exploration of deep sea canyons within the OCNMS*
PRINCIPAL INVESTIGATORS: Sylvia Earle, Ed Bowlby, and Mary Sue Brancato
OBJECTIVE: Conduct first visual and video exploration of one or more deep sea canyons
TASKS: Video surveys to characterize canyon seafloor and biotic communities
PILOTS: Sylvia Earle or other expert pilot
DIVE LOCATION/DURATION: Specific dive sites TBD along Juan de Fuca Canyon and/or Nitinat Canyon. Max depth no greater than 2,000 ft. Dive duration 2-3 hrs.
ALTERNATIVE SITES: Dive locations for other projects, or if bad weather conduct refresher dives at sites north of Cape Flattery or near Grays Harbor.
EQUIPMENT REQUIRED ON SUB: Digital video camera
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops

PROJECT DIVE VI - Science: *Cross-shelf characterization of seafloor and benthic communities*
PRINCIPAL INVESTIGATORS: Ed Bowlby and Mary Sue Brancato
OBJECTIVE: Characterize seafloor habitat and benthos along shelf area transect
TASKS: Video transects from shelf break to nearshore waters
PILOTS: Ed Bowlby and Mary Sue Brancato
DIVE LOCATION/DURATION: Transect along the 4811'N latitude, between 12539'W and 12446'W longitude. Max Depth will not exceed 350 ft. Dive duration 2-3 hr.

ALTERNATIVE SITES: Dive locations for other projects, or if bad weather conduct refresher dives at sites north of Cape Flattery or near Grays Harbor.
EQUIPMENT REQUIRED ON SUB: Digital video camera capable of both vertical and oblique angles, and rigged for laser dots. If samples allowed to be collected, appropriate sampling device and storage tray consistent with other sites.
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops. If samples collected, places to store.

PROJECT DIVE VII - Education: *Olympic Coast Marine Wildlife Natural History Exploration*
PRINCIPAL INVESTIGATORS: Bob Steelquist
OBJECTIVE: Educational dives to portray underwater marine wildlife and habitats to lay person.
TASKS: Conduct video and narrative programs during dives
PILOTS: Bob Steelquist
DIVE LOCATION/DURATION: See Appendix A for dive locations. Max Depth will not exceed 350 ft. Dive duration 2-3 hr.
ALTERNATIVE SITES: Dive locations for other projects, or if bad weather conduct refresher dives at sites north of Cape Flattery or near Grays Harbor.
EQUIPMENT REQUIRED ON SUB: Digital video camera on outside and video and cassette recording equipment inside
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops

PROJECT DIVE VIII - Science: *Fluid and gas expulsion along active mud diapirs and faults, Cascadia subduction margin, WA: Affect on benthic habitat and fisheries, and seafloor mapping*
PRINCIPAL INVESTIGATORS: Pat McCrory
OBJECTIVE: Geological and biological exploration of cold seep areas and other tectonic features
TASKS: Video surveys of areas previously identified by USGS
PILOTS: Ed Bowlby, Mary Sue Brancato, Tom Jagielo, Annette Hoffmann
DIVE LOCATION/DURATION: See Appendix A for dive locations. Max Depth will not exceed 350 ft. Dive duration 2-3 hrs.
ALTERNATIVE SITES: Dive locations for other projects, or if bad weather conduct refresher dives at sites north of Cape Flattery or near Grays Harbor.
EQUIPMENT REQUIRED ON SUB: Digital video camera and cassette recorder
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops

PROJECT DIVE IX - Photographic
PRINCIPAL INVESTIGATORS: Kip Evans
OBJECTIVE: Obtain high quality video images for NOAA/SSE
TASKS: Conduct one dive exclusively for photos
PILOTS: Kip Evans
DIVE LOCATION/DURATION: Site TBD; one dive for 2-3 hrs.; max depth will not exceed 350 ft.
EQUIPMENT REQUIRED ON SUB: Digital video camera
EQUIPMENT REQUIRED ON SHIP: Crane and operator for launch/recovery ops

5.1 OTHER PROJECTS:

EVENT NAME: Open House in Seattle
PURPOSE: VIP, media and public viewing
PRIMARY PARTICIPANTS: Sylvia Earle, SSE, PIs, NOAA, USN
DATE AND TIMES: Wednesday, June 16, 1600 - 2000
SPECIFIC REQUEST FROM SHIP: Ship available to public alongside Seattle Aquarium pier

EVENT NAME: Refueling and/or taking on fresh water
PURPOSE: Refueling and/or taking on fresh water
PRIMARY PARTICIPANTS: *Discovery Bay* crew
DATE AND TIMES: If necessary on or about June 23
ALTERNATIVE DATE AND TIME: As necessary
SPECIFIC REQUEST FROM SHIP: Conducted as expeditiously as possible to not detract from daytime submersible operations

EVENT NAME: Open House in Port Angeles
PURPOSE: VIP, media and public viewing
PRIMARY PARTICIPANTS: Sylvia Earle, SSE, PIs, NOAA, USN
DATE AND TIMES: Wednesday, June 30, 1000 - 1300 hrs
SPECIFIC REQUEST FROM SHIP: Ship available to public alongside Port Angeles city pier

EVENT NAME: Day visitors and/or rotation of scientific personnel
PURPOSE: Opportunity for VIPs, other scientists, and media to see ship operations during temporary visits; also to transfer Web materials ashore
PRIMARY PARTICIPANTS: VIPs, scientists, and media
DATE AND TIMES: TBD
ALTERNATIVE DATE AND TIME: TBD
SPECIFIC REQUEST FROM SHIP: Assist in transfer of personnel to/from small boats

6.0 OPERATIONAL PLANS

The following operational plans can only be considered a guide as to how the Chief Scientist expects the project to progress without being able to predict the weather, operational and scheduling problems, and equipment failures. Appendix A will list geographical positions of transects, sites, and stations.

6.1 SSE PROJECTS: Anticipated conducting 3 sub dives per day, with dive duration 2-3 hrs each. Before each dive there will be a pre-dive check, then launching ops. Scheduled communication will be maintained between sub and ship and/or chase boat. After sub dive and retrieval, there will be battery swaps, followed by the next pre-dive check. At conclusion of last sub dive, the ship will steam to location of night ops.

6.2 ADDITIONAL PROJECTS: Any other work done during the cruise period will be subordinate to the main project and performed so as to not interfere with that outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the main project. See section 10.

7.0 SCIENTIFIC PERSONNEL

7.1 The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Craft Master, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship (2) exceed the time allotted for the cruise (3) result in undue additional expense or (4) change the general intent of the project.

7.2 PARTICIPATING SCIENTISTS

Name	Gender/ Nationality	Position	Organization	Date*
Sylvia Earle	F/USA	Chief Scientist	NGS/SSE	*
Francesca Cava	F/USA	Chief Scientist*	SSE	*
Ed Bowlby	M/USA	Mission Coordinator, Co-PI, pilot	OCNMS	
Mary Sue Brancato	F/USA	Co-PI, pilot	OCNMS	
Bob Steelquist	M/USA	PI, pilot, Mission Log Coordinator	OCNMS	

Carol Bernthal	F/USA	Superintendent	OCNMS	*
George Galasso	M/USA	Acting Manager	OCNMS	*
Dana Wilkes	M/USA	Ops Officer	NOAA/SSE	
Tom Jagielo	M/USA	Co-PI, pilot	WDFW	
Annette Hoffmann	F/USA	Co-PI, pilot	WDFW	
Farron Wallace	M/USA	Co-PI	WDFW	
Jack Tagart	M/USA	Co-PI	WDFW	*
*****		if ROV used	WDFW	*
*****		if ROV used	WDFW	*
Pat McCrory	F/USA	Co-PI	USGS	*
Dan Orange	M/USA	Co-PI	UCSC	*

*include dates if not aboard for entire project.

7.3 PARTICIPATING TECHNICIANS

Name	Gender/Nationality	Position	Organization	Date*
Ian Griffith	M/Canadian	Dive Supervisor	DOER	
****	M/Canadian	Sub Tech/pilot	Nuytco	
****	M/Canadian	Sub Tech/pilot	Nuytco	

*include dates if not aboard for entire project.

7.4 OTHER PERSONNEL

7.5 MEDICAL FORMS

All personnel participating on board will complete a NOAA health Services Questionnaire prior to embarking on the vessel. Forms will be completed and submitted to the Craft Master per NOAA Corps Instruction 6000.

8.0 DATA RESPONSIBILITIES

8.1 DATA AND SAMPLES

8.1.1 The Chief Scientist via the Mission Coordinator is responsible for the data quality, disposition, and archiving of data and samples collected aboard the ship for the primary project. As the representative of the cruise sponsor, the Chief Scientist is also responsible for the dissemination of copies of these data to participants on the cruise and to any other requesters.

8.1.2 The Craft Master will give the acting Chief Scientist a single copy of all data collected by ship's personnel. The Chief Scientist will provide the Craft Master a list of all data collected by the scientific party.

8.1.3 the Mission Coordinator is responsible for all data collected for ancillary projects until those data have been transferred to the projects' Principal Investigator.

8.2 RECORDS AND REPORTS

8.2.1 Marine Operations Abstract (MOA). *Discovery Bay's* officers will maintain the MOA during the cruise. The ship's position will be entered for all operations, and otherwise every 30 minutes or when changing course or speed. The Craft Master will give the Mission Coordinator a copy of the MOA at the completion of the project.

8.2.2 Pre Dive forms will be used to check out the sub prior to each dive and are the responsibility of the pilot and dive crew. Pre Dive forms will be signed by the Dive Supervisor.

8.2.3 Dive Logs will be used to keep track of the subs performance during each dive and are the responsibility of the Dive Supervisor or designee.

8.2.4 The Mission Coordinators Log will provide an accounting of the project work being conducted during each dive and are the responsibility of the Mission Coordinator.

8.2.5 The Mission Log will be based on a compilation of materials collected during dive operations (audio, video, photographs) and information collected post-dive (text provided by pilots), and will be posted on the NGS SSE Web site. The Mission Log is the responsibility of the Mission Log Coordinator.

8.2.6 The Mission Coordinator will complete the Ships Operations Evaluation Form and forward to the Office of NOAA Corps Operations

8.2.7 All film collected during the cruise will be handled in accordance with the MOU between NOAA and NGS.

9.0 EQUIPMENT LISTS

9.1 SUPPLIED BY THE SCIENTIFIC PARTY:

(A) Two *DeepWorker 2000* submersibles (SSE)
(B) Boat as sub tender for launch/recovery operations (OCNMS)
(B) Phantom ROV (WDFW)
(C) CTD rosette (OCNMS)
(D) Bottom grab (OCNMS)
(E) Plankton nets (OCNMS)

9.2 SUPPLIED BY THE DISCOVERY BAY:

(A) Auxiliary fresh water bladder

10.0 ADDITIONAL AND ANCILLARY PROJECTS

10.1 ADDITIONAL PROJECTS: Any other work done during the cruise period will be subordinate to the main project and performed so as to not interfere with that outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the main project.

10.1.2 These are projects related to the cruise, but not to SSE. Such projects are to be conducted at night or during extended down times of the SSE. The following projects are still in development stage:

Project Title: Mapping seafloor habitats
Principal Investigators: Dwayne Peacock and Ed Bowlby
Objective: Map seafloor to assess gross habitat features in preparation for year 2000 SSE dives
Task: Survey seafloor habitats during two night ops
Location: TBD
Alt Site:
Equip Ship: Side-scan sonar equipment and technical team (techs will be transferred off ship at completion of mission)
Equip Scientific Party: None

Project Title: Sampling bottom sediments
Principal Investigator: Ed Bowlby
Objective: Sample infaunal communities and sediments to correlate with DP #2 & #4
Task: Use bottom grabs during night ops
Location: Sites along DP #2 & #4 and others TBD
Equip Ship: Use of ship's deck space to deploy bottom grab
Equip Scientific Party: Bottom grab and personnel to deploy off ship

Project Title: Physical oceanography
Principal Investigator: TBD
Objective: Collect water samples throughout water column to correlate with previous *McArthur* cruises from 1995-1998
Task: Collect water samples and physical profiles with CTD rosette during night ops
Location: TBD
Alt Site:
Equip Ship: Use of ship's deck space to deploy rosette
Equip Scientific Party: CTD rosette with water bottles

Project Title: Plankton sampling
Principal Investigator: TBD
Objective: Collect plankton to correlate with food webs
Task: Use dip nets to collect plankton Phantom ROV
Location: TBD
Alt Site:
Equip Ship: Use of ship's deck space to deploy dip nets
Equip Scientific Party: plankton nets

Project Title: Survey fish habitats and behaviors
Principal Investigators: TBD and Tom Jagielo
Objective: Survey fish habitats related to DP#1
Task: Use ROV to survey fish habitats and behaviors during 5 night ops
Location: TBD
Alt Site:
Equip Ship: Use of ship's deck space and crane to deploy/retrieve ROV
Equip Scientific Party: Phantom ROV

10.2 ANCILLARY PROJECTS: Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force.

10.2.1 Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions.

11.0 MISCELLANEOUS

11.1 Navigation Control: Shipboard DGPS provided for vessel. Submersible navigation provided by NUYTCO

11.2 Required Compliance: The Chief Scientist will require each Mission Coordinator to contact local authorities to increase the safety and awareness of the operations. These authorities include :

11.2.1 US Coast Guard Station responsible for the area of coverage in the cruise instructions.

11.2.2 Local Notice to Mariners in the district concerning the area covered in the cruise instructions.

11.2.3 Port Authority or Harbor master for potential dive sites.

11.3 A per diem rate will be charged for all meals.

11.4 Pre-Cruise Meeting: A pre-cruise meeting between the Chief Scientist, the Craft Master, the Mission Coordinator, and the Dive Supervisor will be held prior to the commencement of operations to do a final review of the cruise plan.

11.5 Post-Cruise debrief: A post-cruise debriefing between the Chief Scientist, the Craft Master, the Mission Coordinator, the Dive Supervisor, a Naval Undersea Warfare Center representative, and the Mission Coordinator for the next site will be held to review any problems that occurred.

11.6 HAZMATS

12.0 COMMUNICATIONS

12.1). *Discovery Bay* will communicate daily, Monday through Friday, with NOAA's Pacific Marine Center (necessary?). Normally this will be via message, but radio contact will be maintained when possible.

12.2 Because the scientific staff must sometimes communicate with other research vessels, commercial vessels, and shore-based NOAA facilities, the Chief Scientist or his designee may request the use of radio transceivers aboard the vessel.

12.3 *Discovery Bay* is equipped with INMARSAT (?) and cellular telephone. The Chief Scientist may need access to these systems with permission from the Craft Master. The Craft Master will provide the Chief Scientist with a log of all calls made from the ship by the scientific party at the completion of the project.

13.0 APPENDICES

(A) List of Coordinates for tracklines or stations.
(B) Chartlets
(C) Emergency Contact phone number

_____ _____ _____ _____

Captain Thomas Violette, USN Date Sylvia Earle Date
Commander, Naval Undersea Warfare Center Chief Scientist
Sustainable Seas Expeditions

_____ _____

Ed Bowlby Date
Mission Coordinator
OCNMS/SSE

APPENDIX A. Station locations and depths for submersible dives, ranked in order of priority.

PROJECT DIVE I - Launch/recovery; sites TBD

PROJECT DIVE II - Evaluation dives; Cape Alava area, specific sites TBD

PROJECT DIVE III - Science: *In situ studies of groundfish and invertebrates in trawlable and untrawlable survey habitats*

Dive #	Latitude	Longitude	Depth (ft.)	Notes
III-1				Specific lat/longs TBD from area bounded
III-2				between 4813'N & 4816'N and between
III-3				12517'W & 12538'W
III-4				
III-5				
III-6				
III-7				
III-8				
III-9				
III-10				

PROJECT DIVE IV - Science: *Comparison of habitat complexity and benthic invertebrate communities in lightly and heavily trawled areas*

Dive #	Latitude	Longitude	Depth (ft.)	Notes
IV-1				Specific lat/longs TBD from area bounded
IV-2				between 4813'N & 4816'N and between
IV-3				12517'W & 12538'W; addition sites
IV-4				TBD from a commercial log database
IV-5				
IV-.6				
IV-7				
IV-8				
IV-9				
IV-10				

PROJECT DIVE V - Exploration: *Exploration dives*

Dive #	Latitude	Longitude	Depth (ft.)	Notes
V-1	4806'30"N 4804'20"N 4757'15"N 4754'30"N	12520'00"W 12514'30"W 12529'30"W 12520'00"W	480 - 2,000	Juan de Fuca Canyon recommended; specific sites TBD within the boundaries
V-2	4811'05"N 4805'00"N 4815'15"N 4813'00"N	12553'50"W 12548'00"W 12537'10"W 12534'45"W	480 - 2,000	Nitinat Canyon recommended; specific sites TBD within the boundaries
V-3				
V-4				
V-5				
V-6				

PROJECT DIVE VI - Science: *Cross-shelf characterization of seafloor and benthic communities*

Dive #	Latitude	Longitude	Depth (ft.)	Notes
VI-1	4811'00"N	12539'00"W	100 - 600	specific sites TBD from representative
VI-2		to		areas along Cape Alava transect
VI-3		12446'00"W		
VI-4				
VI-5				
VI-6				

PROJECT DIVE VII - Education: *Olympic Coast Marine Wildlife Natural History Education Dives*

Dive #	Latitude	Longitude	Depth (ft.)	Notes
VII-1	TBD		40 - 60	shallow fish assemblage site
VII-2	TBD		150	midwater fish assemblage site
VII-3	48.42N	124.67W	303	Hump
VII-4	48.41N	124.68W	370	Finger
VII-5	48.47N	124.94W	307	Swiftsure #6
VII-6	48.30N	125.38W	320	Blue Dot

PROJECT DIVE VIII - Science: *Fluid and gas expulsion along active mud diapirs and faults, Cascadia subduction margin, WA: Affect on benthic habitat and fisheries, and seafloor mapping*

Dive #	Latitude	Longitude	Depth (ft.)	Notes
VIII-1	4740.0'N	12447.0'W		
VIII-2	4740.0'N	12442.5'W		
VIII-3	4656.4'N	12421.6'W		
VIII-4	4656.0'N	12419.5'W		
VIII-5	4722.5'N	12423.4'W		
VIII-6	4719.0'N	12422.0'W		

PROJECT DIVE IX - Photographic

IX-1 one dive at site TBD